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# Rotary Vacuum Dryer



## About Us

**NSI Equipments Pvt. Ltd.** is a fast emerging company specializing in the design and manufacture of **VACUUM DRYER** for industrial use for the past four decades. Over the years NSIE has consolidated its experience in its field and has developed its expertise. Our endeavor is to supply well engineered product to the specific need of our customers. Customer satisfaction is our paramount importance, which is the foundation to our business policy. We have excellent reputation for the quality of our product range as always endeavoring to advance technology, appropriate fabrication processes at all stages of manufacture.

This has been possible with the active participation of our management, staff and workers. Everyone has contributed in his own manner and ultimately it is teamwork that has won.

## Vision

**NSI Equipments Pvt. Ltd.** vision is to excel and provide technology that is the most advanced in Asia and at par with the international league. We believe every satisfied customer is an asset and we target to satisfy each and every customer walking in through our door. We envisage achieving these ambitious growth plans as Green Progress meaning attaining the goals in symbiosis with environment and it's an integral part of our corporate vision.

### Our credo is:-

Customer orientation to develop products (machines and auxiliaries) that seek to meet customer aspirations. An organization reputation that instills confidence in the customer to seek pre-purchase counseling, validation through trials and service needs that may arise.

## Mission

**NSI Equipments Pvt. Ltd.** mission is to consolidate at the forefront of our Product Lines in Asia. We believe everything is possible with right efforts and dedication. We are confident that we will achieve our goal by:

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## Quality Policy

“To be passive and proactive in providing quality product and solutions to clients by continuously striving to exceed their expectations”

Our commitment to quality is unflinching. Our desire for growth is deep rooted and our capacity for details is amazing. We adhere to national and international standards across all operations: from sourcing the raw materials & till it transfers to the finished machinery and finally successful commissioning. All our suppliers operate quality management standards as dictated by specific markets. This measure undoubtedly reflects our royalty to quality assurance and our determination to provided the products and service our customers demand.

What set us apart is the depth of our commitment and the high level of our concern to deliver quality products, efficient services and total solutions.

And this is where our quality improvement comes from.

At NSIE, **quality is a way of life.**

## Customer Satisfaction

Customer satisfaction is the foremost concern in our work culture. That is why a few of our products are very popular among users. We have met stringent delivery schedules and accepted challenges of precision manufacturing. We have extended our services to small scale and large-scale customers equally, and bagged repeat orders.

# Rotary Vacuum Dryer



## Principle

A centrifuge is a unique energy efficient machine and works by spinning the vessel containing the material to be separated at high speed through centrifugal force as solids and liquid. It is widely used in pharmaceutical and chemical industries for solids & liquids separation. The centrifuge spins at high speed and due to centrifugal force the liquid is forced out through filter media and the solids are retained within the filter media inside the basket. These solids are discharged by various discharging methods, like manual discharge, bag lifting type, through pneumatic / hydraulic operated scrapper.

## Introduction

Rotary vacuum dryers offer clean, simple and effective method of drying wet cake, powder and even slurry. Labor and energy costs are minimal compared to tray dryers and product losses during handling are also negligible. Additionally valuable organic solvents can be conveniently condensed and recovered.

## Working Principle

The drying in a rotary vacuum dryer is a batch operation under vacuum. It is possible to dry heat sensitive materials at well below boiling points of water and solvents. Drying time depends on material being dried, amount of solvent or water to be removed, desired final moisture content, permissible jacket temperature etc. The dryer is available in sizes ranging from 100 liters to 20,000 liters gross volume. The volume of wet material loaded into the dryer is usually restricted to 50% of gross volume.

- Rotary Vacuum Dryers (RVD) also known as Vanuleuth Dryer is a cylindrical jacketed vessel with a central agitator having specially designed blades. The blades of this Rotary Vacuum Paddle Dryer (RVPD) are so designed that they sweep the entire internal surface and at the same time turn the material so that all the particles are come in contact with the heated surface.
- The central agitator shaft is supported on the two end bearings housed in bearing housing in such a way that the alignment remains always intact. This central agitator is driven by means of a Motor & Gear box through the bull Gear.
- Cooling could also be provided by cold water / brine refrigerant through the jacket.
- The horizontal shell is jacketed to heat the shell with steam/hot water or any other thermal fluid. Limpet coil is provided instead of jacket if the heating media is fluid.
- A Dust Catcher consisting of bag filter is provided on the top to prevent the losses of material particles after the drying process.
- A Condenser of adequate heating surface area is provided wherein the evaporated vapors are condensed and these condensed vapors are then collected in the receiver of suitable capacity, placed beneath the condenser.
- A Vacuum Pump of adequate capacity is provided & fitted to the receiver of these rotary vacuum dryers to create the vacuum in the dryer shell through the Receiver, Condenser and Dust Catcher.

## Operation



These Rotary Vacuum Dryer give drying, mixing and breaking effects simultaneously. Wet cake or slurry is fed through charging door, while the agitator is rotating in clockwise direction, vacuum is applied in the dryer and heating media is circulated in the jacket. Evaporation of moisture takes place under vacuum and vapors passes through the dust catcher into the condenser, where it is condensed and collected in the receiver. Dried material is discharged through discharge valve. The lump breaker rods are provided to achieve good drying effect.

This is a high efficiency dryer unit used for drying of wet cake product after filtration. This equipment can be used in drying process of various Pharmaceuticals, Intermediate Compounds, Fine Chemicals, Chemicals, Agro Chemicals, Pesticides, Insecticides, Dyes and Food Products.

### Salient Features of Rotary Vacuum Dryers (RVD)

- Very suitable for drying materials which are heat sensitive, as low temperature for drying can be maintained by high vacuum
- Lowest energy consumption compared to any other batch type dryer due to higher differential temperatures.
- Higher Thermal Efficiency.
- Almost 100% recovery of solvents.
- Heating Temp.: From 30°C to 300°C.
- Evaporation Rate 4-12 Kg/H/Sq.m of heating surface area of water at heating temperature of 100°C.
- Limpet coil could be provided instead of jacket if the heating media is fluid.
- Breaker bars of approximately same length as dryer shell can be provided if lump formation is expected during drying.
- Unique quick opening discharge valve permits direct packing of dry product into bags or drums.

- Shaft sealing by mechanical seals is also available.
- Vacuum reduces thermal stress and sustains better colour and texture of dried products compared to those that were air-dried.
- The vessel is well design to take temperature stresses during vacuum drying. Low power consumption by the use of helical bevel gear box.
- To remove the condensate formed by steam heating in the hollow shaft, Special rotary joints are also designed to introduce heating media in the hollow shaft.
- Product Filter is very efficiently used to arrest valuable product carried away with the vapours in a filter bag the arrested product particles are thrown back into the dryer by reverse flow of pulsating air. Generally the product filter is heated to avoid Condensations of vapors in the filter bag.
- User friendly discharge valve design provides vacuum tight closing when the material is processed and quick opening lever facilities filling of bags when material discharge and packed.
- Arrangements for nitrogen purging provided. Bag cleaning arrangements with pulsation by nitrogen jet injector provided.
- Efficient rotary joint to inject heating media into agitator and remove condensate.

### Optional Features

- Mechanicals Seals can be provided instead of stuffing box for certain applications.
- Pneumatic/Hydraulically operated discharge valves.
- Solvent recovery system inclusive of condenser, receiver, vacuum system and interconnecting piping.
- Complete instrumentation for DCS control/Control room operations. Variable speed drives (Frequency inverter).

## Hollow Shaft And Paddles



- The hollow rotating agitator shaft imparts heat to the product, scrapes the shell wall, and tumbles the product for maximum heat transfer and discharge product when required.
- The large heat transfer area available on the wide paddles and hollow shaft give maximum heat transfer efficiency to the product.
- The scrapers have minimum calculated clearance from the shell to keep the shell clean and increase heat transfer coefficient.
- Unique condensate removal mechanism employed in the shaft.
- Mechanical seal are offered for high vacuum.
- Shaft is hardened and ground when gland packing is used.

## Discharge Valve



- User friendly discharge valve design provides vacuum tight closing when the material is processed and quick opening lever facilitates filling of bags when material is discharge and packed.
- Pneumatically closing, opening, locking and cleaning mechanism is offered for automation.

## Product Filter



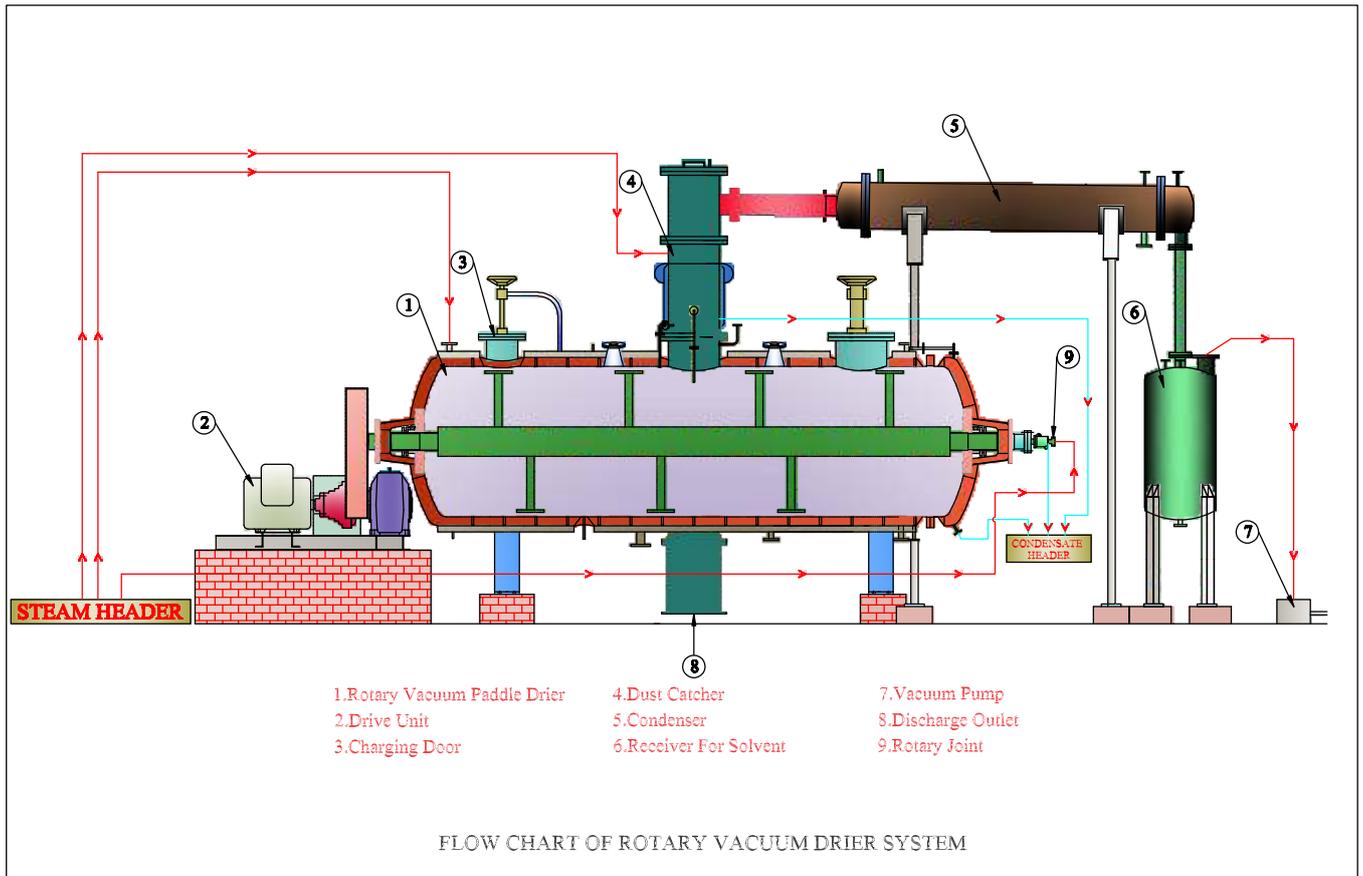
- Product filter is very is very efficiently used to arrest valuable product carried away with the vapours in the filter bag. The arrested product particles are thrown back into the dryer by reverse flow of pulsating air.
- Generally the product filters are heated to avoid condensation of vapors in the filter bag.

## Application Area

**Our Offered Rotary Vacuum Paddle Dryer can be used in various areas like -**

- Pharmaceutical Industry
- Intermediate Compounds and Fine Chemicals
- Organic Chemicals and Agro Chemicals
- Pesticides, Insecticides and Dyes
- Food Products

## Flow Chart of Rotary Vacuum Dryer



### TECHNICAL DATA

Model	Total Volume (LTS)	Working Volume (LTS)	Heating Surface Area (SQ. MTS)	Power Required for Agitator Motor (HP)	Approx. Size of Dryer ell (Dia x Length)
RVD-250	500	250	3.2	7.5	700 x 1400
RVD-500	1000	500	6	10	900 x 1700
RVD-750	1500	750	7.7	10	1000 x 2000
RVD-1000	2000	1000	8.7	15	1100 x 2100
RVD-1250	2500	1250	10	20	1200 x 2250
RVD-1500	3000	1500	11.6	20	1260 x 2400
RVD-2000	4000	2000	16.7	30	1200 x 3600
RVD-3000	6000	3000	17.7	40	1600 x 3000
RVD-4000	8000	4000	23.5	50	1600 x 4000
RVD-5000	10000	5000	27.3	60	1700 x 4400

## Photo Gallery





# NSI EQUIPMENTS PVT. LTD.

## LIST OF EQUIPMENTS MANUFACTURED BY US

- CENTRIFUGES
- REACTION VESSELS
- ROTARY VACUUM DRYERS
- ROTARY DRYERS
- ROTARY DRUM DRYER
- SPRAY DRYER
- SPIN FLASH DRYERS
- AGITATED NUTSCHE FILTER & DRYER
- RIBBON BLENDERS
- ROTARY FLAKER
- BALL MILLS
- AIR CLASSIFYING MILLS (ACM)
- JET MILLS
- ROTARY AUTOCLAVE
- EVAPORATOR
- CONDENSER
- BUCKET ELEVATOR
- SCREW CONVEYOR
- BELT CONVEYOR
- FLUE GAS DESULPHITER

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